



Material Safety Data Sheet

Conforms to EU Directive 91/155/EC and ISO 11014-1

Product name : 9600 Series Polyester Screen Inks

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Version : 1.00

Date of issue : 13/11/2005.

Date of previous issue : No previous validation.

1. Identification of the substance/preparation and of the company

Product name : 9600 Series Polyester Screen Inks
Product code : 436
Use of the substance/preparation : Solvent based screen ink
Supplier : GL Specialized Inks (Pty) Ltd
 8 Hawthorne Place, Mahogany Ridge, Pinetown, Durban
 36 Roper Street, New Centre, Johannesburg
 19 Vierlanden Street, Durbanville, Cape Town
Emergency telephone number : 031 - 700 6455
 011 - 493 0383
 021 - 975 5240

2. Composition/information on ingredients

Chemical characterization : Mixture

| Ingredient name | CAS number | % | EC number | Classification |
|--|------------|---------|-----------|---|
| resin mixtures | | 18 - 31 | | Not classified. |
| pigment mixture | | 0 - 10 | | Not classified. |
| gamma butyrolactone | 96-48-0 | 19 - 36 | 202-509-5 | Xn; R22 |
| titanium dioxide | 13463-67-7 | 0 - 37 | 236-675-5 | Not classified. |
| solvent naphtha (petroleum), heavy arom. | 64742-94-5 | 12 - 22 | 265-198-5 | Xn; R65 |
| lead chromate molybdate sulfate red | 12656-85-8 | 0 - 30 | 235-759-9 | Carc. Cat. 3; R40 Repr. Cat. 1; R61 Repr. Cat. 3; R62 R33 N; R50/53 |
| lead sulfochromate yellow | 1344-37-2 | 0 - 30 | 215-693-7 | Carc. Cat. 3; R40 Repr. Cat. 1; R61 Repr. Cat. 3; R62 R33 N; R50/53 |
| cyclohexanone | 108-94-1 | 8 - 19 | 203-631-1 | R10 Xn; R20 |
| copper | 7440-50-8 | 0 - 15 | 231-159-6 | N; R50/53 |
| aluminium | 7429-90-5 | 0 - 10 | 231-072-3 | F; R15 R10 |
| carbon black | 1333-86-4 | 0 - 8 | 215-609-9 | Not classified. |
| naphthalene | 91-20-3 | <3 | 202-049-5 | Xn; R22 N; R50/53 |
| silica, crystalline - cristobalite | 14464-46-1 | 0 - 4 | 238-455-4 | Not classified. |
| silica, amorphous, fumed | 7631-86-9 | 0 - 2 | 231-545-4 | Not classified. |
| 2,2'-oxybisethanol | 111-46-6 | 0 - 2 | 203-872-2 | Xn; R22 |
| See section 16 for the full text of the R-phrases declared above | | | | |

Occupational exposure limits, if available, are listed in section 8.

This MSDS covers all formulations in the the range. Not all of the components listed will be present in an individual formulation. Formulae specific MSDS available on request.

3. Hazards identification

The preparation is classified as dangerous according to Directive 1999/45/EC and its amendments.

| | |
|----------------------------------|---|
| Classification | : Carc. Cat. 3; R40 Repr. Cat. 1; R61 Repr. Cat. 3; R62 Xn; R22 R33 N; R50/53 |
| Physical/chemical hazards | : No known significant effects or critical hazards. |
| Human health hazards | : Harmful if swallowed. Danger of cumulative effects. Limited evidence of a carcinogenic effect. May cause harm to the unborn child. Possible risk of impaired fertility. |
| Environmental hazards | : Very toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment. |

See section 11 for more detailed information on health effects and symptoms.

4. First aid measures

| | |
|---------------------|--|
| Inhalation | : Move exposed person to fresh air. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. |
| Ingestion | : Get medical attention immediately. Wash out mouth with water. Remove dentures if any. Move exposed person to fresh air. Keep person warm and at rest. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. |
| Skin contact | : Wash contaminated skin with soap and water. Get medical attention if irritation develops. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing or wear gloves. Wash clothing before reuse. Clean shoes thoroughly before reuse. |
| Eye contact | : Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs. |

See section 11 for more detailed information on health effects and symptoms.

5. Fire-fighting measures

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| Extinguishing media | |
| Suitable | : In case of fire, use water spray (fog), foam or dry chemical. |
| Not suitable | : None known. |
| Special exposure hazards | : No specific hazard. This material is very toxic to aquatic organisms. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain. |
| Hazardous thermal decomposition products | : These products are carbon oxides (CO, CO ₂). Some metallic oxides. |
| Special protective equipment for fire-fighters | : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. |

6. Accidental release measures

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| Personal precautions | : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment. |
| Environmental precautions | : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. : |

Methods for cleaning up If emergency personnel are unavailable, contain spilled material. For small spills, add absorbent (soil may be used in the absence of other suitable materials), scoop up material and place in a sealable, liquid-proof container for disposal. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal.

7. Handling and storage

- Handling** : Do not ingest. Avoid contact of spilled material and runoff with soil and surface waterways. Wash thoroughly after handling.
- Storage** : Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).
- Packaging materials**
- Recommended** : Use original container.

8. Exposure controls/personal protection

| Ingredient name | Occupational exposure limits |
|--|--|
| titanium dioxide | <p>ACGIH (United States). TWA: 10 mg/m³</p> <p>ACGIH TLV (United States, 1/2004). Notes: Substance identified by other sources as a suspected or confirmed human carcinogen. 1996 Adoption Substances for which the TLV is higher than the OSHA Permissible Exposure Limit (PEL) and/or the NIOSH Recommended Exposure Limit (REL). See CFR 58(124) :36338-33351, June 30, 1993, for revised OSHA PEL. Refers to Appendix A -- Carcinogens. TWA: 10 mg/m³ 8 hour/hours. Form: All forms</p> |
| solvent naphtha (petroleum), heavy arom. | <p>ACGIH (United States). TWA: 100 ppm TWA: 525 mg/m³</p> |
| cyclohexanone | <p>EU OEL (Europe, 4/2004). Skin Notes: Indicative STEL: 81.6 mg/m³ 15 minute/minutes. Form: All forms STEL: 20 ppm 15 minute/minutes. Form: All forms TWA: 40.8 mg/m³ 8 hour/hours. Form: All forms TWA: 10 ppm 8 hour/hours. Form: All forms</p> |
| copper | <p>ACGIH TLV (United States, 1/2004). Notes: Adopted Values enclosed are those for which changes are proposed. Consult the Notice of Intended Changes for current proposal. See Notice of Intended changes. TWA: 1 mg/m³ 8 hour/hours. Form: All forms</p> <p>ACGIH TLV (United States, 1/2004). Notes: Adopted Values enclosed are those for which changes are proposed. Consult the Notice of Intended Changes for current proposal. Substances for which the TLV is higher than the OSHA Permissible Exposure Limit (PEL) and/or the NIOSH Recommended Exposure Limit (REL). See CFR 58(124) :36338-33351, June 30, 1993, for revised OSHA PEL. See Notice of Intended changes. TWA: 0.2 mg/m³ 8 hour/hours. Form: Fume</p> |
| aluminium | <p>ACGIH (United States). Notes: Respirable TWA: 5 mg/m³</p> <p>ACGIH TLV (United States). Notes: Total TWA: 15 mg/m³ 8 hour/hours.</p> <p>ACGIH TLV (United States, 1/2004). TWA: 5 mg/m³ 8 hour/hours. Form: All forms TWA: 10 mg/m³ 8 hour/hours. Form: Dust TWA: 5 mg/m³ 8 hour/hours. Form: Fume</p> |
| carbon black | <p>ACGIH TLV (United States, 1/2004). Notes: Substance identified by other sources as a suspected or confirmed human carcinogen. 1996 Adoption Refers to Appendix A -- Carcinogens. TWA: 3.5 mg/m³ 8 hour/hours. Form: All forms</p> |
| naphthalene | <p>EU OEL (Europe, 6/2000). Notes: Indicative TWA: 50 mg/m³ 8 hour/hours. Form: All forms TWA: 10 ppm 8 hour/hours. Form: All forms</p> |
| silica, crystalline - cristobalite | <p>ACGIH TLV (United States, 1/2005). Notes: Substance identified by other sources as a suspected or confirmed human carcinogen. Respirable fraction; see Appendix C, paragraph C. TWA: 0.05 mg/m³ 8 hour/hours. Form: All forms</p> |
| silica, amorphous, fumed | <p>ACGIH (United States). TWA: 10 mg/m³ TWA: 6 mg/m³</p> |

Occupational exposure controls : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective occupational exposure limits. Ensure that eyewash stations and safety showers are close to the workstation location.

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| Respiratory protection | Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. |
| Hand protection | : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Recommended: Neoprene gloves. Nitrile gloves. |
| Eye protection | : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. |
| Skin protection | : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. |

9. Physical and chemical properties

General information

Appearance

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|-----------------------|--|
| Physical state | : Liquid. (Viscous liquid.) |
| Color | : Various |
| Odor | : Characteristic. |
| Odor threshold | : The lowest known value is 0.88 ppm (cyclohexanone) |

Important health, safety and environmental information

| | |
|---|--|
| Boiling point | : >150°C (302°F) |
| Melting point | : May start to solidify at -6.5°C (20.3°F) based on data for: 2,2'-oxybisethanol. |
| Flash point | : Closed cup: 55 to 58°C (131 to 136.4°F). |
| Flammability (solid, gas) | : Combustible liquid. |
| Explosive properties | : Explosive in the presence of the following materials or conditions: open flames, sparks and static discharge and heat. |
| Explosion limits | : The greatest known range is Lower: 1.6% Upper: 10.8% (2,2'-oxybisethanol) |
| Vapor pressure | : The highest known value is 0.7 kPa (5 mm Hg) (at 20°C) (cyclohexanone). |
| Relative density | : Weighted average: 1.27 g/cm ³ |
| Solubility | : Easily soluble in methanol, diethyl ether, n-octanol, acetone. Insoluble in cold water, hot water. |
| Octanol/water partition coefficient | : The product is much more soluble in octanol. |
| Vapor density | : The highest known value is 4.8 (Air = 1) (Solvent naphtha (petroleum), heavy arom.). |
| Evaporation rate (butyl acetate = 1) | : The highest known value is 0.3 (cyclohexanone) compared with Butyl acetate. |

Other information

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|----------------------------------|--|
| Auto-ignition temperature | : The lowest known value is 228.89°C (444°F) (2,2'-oxybisethanol). |
|----------------------------------|--|

10. Stability and reactivity

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|---|---|
| Stability | : The product is stable. |
| Conditions to avoid | : Avoid all possible sources of ignition (spark or flame). |
| Materials to avoid | : Reactive or incompatible with the following materials: oxidizing materials, acids, alkalis. |
| Hazardous decomposition products | : Evolves toxic fumes when heated to decomposition. |

11. Toxicological information

Potential acute health effects

| | |
|---------------------|---|
| Inhalation | : No known significant effects or critical hazards. |
| Ingestion | : Harmful if swallowed. |
| Skin contact | : No known significant effects or critical hazards. |
| Eye contact | : No known significant effects or critical hazards. |

Acute toxicity

| <u>Product/ingredient name</u> | <u>Test</u> | <u>Result</u> | <u>Route</u> | <u>Species</u> |
|--------------------------------|-------------|---------------|--------------|----------------|
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|--------------------------|------|--------------|--------|------------|
| gamma butyrolactone | LD50 | 1540 mg/kg | Oral | Rat |
| | LD50 | 1460 mg/kg | Oral | Mouse |
| cyclohexanone | LD50 | 1400 mg/kg | Oral | Mouse |
| | LDLo | 1600 mg/kg | Oral | Rabbit |
| carbon black | LD50 | >15400 mg/kg | Oral | Rat |
| | LD50 | >3000 mg/kg | Dermal | Rabbit |
| naphthalene | LD50 | 490 mg/kg | Oral | Rat |
| | LD50 | 316 mg/kg | Oral | Mouse |
| | LD50 | 1200 mg/kg | Oral | Guinea pig |
| | LD50 | >2500 mg/kg | Dermal | Rat |
| | LDLo | 100 mg/kg | Oral | child |
| | LDLo | 400 mg/kg | Oral | Dog |
| silica, amorphous, fumed | LD50 | 3160 mg/kg | Oral | Rat. |
| 2,2'-oxybisethanol | LD50 | 12565 mg/kg | Oral | Rat |
| | LD50 | 4400 mg/kg | Oral | Rabbit |
| | LD50 | 3300 mg/kg | Oral | Cat. |
| | LD50 | 11890 mg/kg | Dermal | Rabbit |

Potential chronic health effects

| <u>Ingredient name</u> | <u>Carcinogenic effects</u> | <u>Mutagenic effects</u> | <u>Developmental toxicity</u> | <u>Impairs fertility</u> |
|-------------------------------------|-----------------------------|--------------------------|-------------------------------|--------------------------|
| lead chromate molybdate sulfate red | Carc. Cat. 3; R40 | - | Repr. Cat. 1; R61 | Repr. Cat. 3; R62 |
| lead sulfochromate yellow | Carc. Cat. 3; R40 | - | Repr. Cat. 1; R61 | Repr. Cat. 3; R62 |

Carcinogenicity : Contains material which may cause cancer, based on animal data. Risk of cancer depends on duration and level of exposure.

Mutagenicity : No known significant effects or critical hazards.

Reproductive toxicity : Contains material which can cause birth defects.

Over-exposure signs/symptoms

Inhalation : Inhalation of vapors may cause dizziness, an irregular heartbeat, narcosis, nausea or asphyxiation.

Ingestion : Ingestion may cause nausea, weakness and central nervous system effects.

Skin : Repeated skin exposure can produce local skin destruction or dermatitis.

Target organs : Contains material which causes damage to the following organs: blood, kidneys, lungs, the nervous system, liver, mucous membranes, upper respiratory tract, skin, central nervous system (CNS), eye, lens or cornea

12. Ecological information

Ecotoxicity data

| <u>Ingredient name</u> | <u>Species</u> | <u>Period</u> | <u>Result</u> |
|------------------------|----------------------------|---------------|---------------|
| titanium dioxide | Daphnia magna (EC50) | 48 hour/hours | >1000 mg/l |
| cyclohexanone | Pimephales promelas (LC50) | 96 hour/hours | 527 mg/l |
| | Pimephales promelas (LC50) | 96 hour/hours | 630 mg/l |
| | Pimephales promelas (LC50) | 96 hour/hours | 732 mg/l |
| copper | Daphnia magna (EC50) | 48 hour/hours | 0.0318 mg/l |
| | Daphnia magna (EC50) | 48 hour/hours | 0.036 mg/l |
| | Daphnia magna (EC50) | 48 hour/hours | 0.055 mg/l |
| | Pimephales promelas (LC50) | 96 hour/hours | 0.0094 mg/l |
| | Pimephales promelas (LC50) | 96 hour/hours | 0.0103 mg/l |
| | Pimephales promelas (LC50) | 96 hour/hours | 0.0278 mg/l |
| aluminium | Oncorhynchus mykiss (LC50) | 96 hour/hours | 0.12 mg/l |
| | Oncorhynchus mykiss (LC50) | 96 hour/hours | 0.16 mg/l |
| | Oncorhynchus mykiss (LC50) | 96 hour/hours | 0.31 mg/l |
| naphthalene | Daphnia magna (EC50) | 48 hour/hours | 1.6 mg/l |
| | Daphnia magna (EC50) | 48 hour/hours | 2.194 mg/l |
| | Daphnia magna (EC50) | 48 hour/hours | 2.55 mg/l |
| | Daphnia pulex (LC50) | 96 hour/hours | 1 mg/l |
| | Oncorhynchus mykiss (LC50) | 96 hour/hours | 1.6 mg/l |
| | Oncorhynchus mykiss (LC50) | 96 hour/hours | 1.8 mg/l |
| 2,2'-oxybisethanol | Pimephales promelas (LC50) | 96 hour/hours | 75200 mg/l |
| | daphnia (LC50) | 96 hour/hours | 1 ppm |

Other ecological information

Persistence/degradability

| <u>Ingredient name</u> | <u>BOD₅</u> | <u>COD</u> | <u>ThOD</u> |
|------------------------|-----------------------------------|--------------------------|-------------------------|
| naphthalene | - | 1.88 g O ₂ /g | - |
| 2,2'-oxybisethanol | <1 g O ₂ /g [5 - 20 d] | - | - |
| <u>Ingredient name</u> | <u>Aquatic half-life</u> | <u>Photolysis</u> | <u>Biodegradability</u> |

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| gamma butyrolactone | - | 7 day/days. | - |
| cyclohexanone | 4.1 to 33 day/days | 1.3 day/days. | Inherent |
| copper | > 100 day/days | - | Not readily |
| naphthalene | 0.5 to 20 day/days | 0.1 to 1.5 day/days. | Inherent |
| 2,2'-oxybisethanol | - | <1 day/days. | Readily |

Bioaccumulative potential




| <u>Ingredient name</u> | <u>LogP_{ow}</u> | <u>BCF</u> | <u>Potential</u> |
|------------------------|--------------------------|------------|------------------|
| gamma butyrolactone | -0.64 | 3.2 | low |
| cyclohexanone | 0.81 | 2.4 | low |
| copper | - | 1000 | high |
| naphthalene | 3.01 | 1.5 to 3 | high |
| 2,2'-oxybisethanol | - | 0.05 | low |

Other adverse effects : Very toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

13. Disposal considerations

Methods of disposal : Hazardous chemical waste.
Waste must be disposed to a landfill permitted in terms of the Department of Water Affairs and Forestry's minimum requirements for waste disposal to landfill, and the minimum requirements for the handling, classification and disposal of hazardous waste.

14. Transport information

| Regulatory information | UN number | Proper shipping name | Class | Packing group | Label | Additional information |
|------------------------|-----------|----------------------|-------|---------------|--|--|
| ADR / SANS 10228 Class | UN1210 | PRINTING INK | 3 | III |  | Hazard identification number 30 Limited quantity LQ7 CEFIC Tremcard 30GF1-III of 30GF1-sp |
| IMDG Class | UN1210 | PRINTING INK | 3 | III |  | Emergency schedules (EmS) F-E, S-D |
| IATA Class | UN1210 | PRINTING INK | 3 | III |  | Passenger and Cargo Aircraft Quantity limitation: 60 L Packaging instructions: 309 Cargo Aircraft Only Quantity limitation: 220 L Packaging instructions: 310 Limited Quantities - Passenger Aircraft Quantity limitation: 10 L Packaging instructions: Y309 |

15. Regulatory information

SANS 10265 / EU Regulations

Hazard symbol/symbols :



Toxic, Dangerous for the environment.

Risk phrases :

- : R40- Limited evidence of a carcinogenic effect.
- R61- May cause harm to the unborn child.
- R62- Possible risk of impaired fertility.
- R22- Harmful if swallowed.
- R33- Danger of cumulative effects.
- R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

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|-----------------------|--|
| Safety phrases | S53- Avoid exposure - obtain special instructions before use. S36/37- Wear suitable protective clothing and gloves. S61- Avoid release to the environment. Refer to special instructions/Safety data sheets. |
| Contains | : gamma butyrolactone 202-509-5 lead chromate molybdate sulfate red 235-759-9 lead sulfochromate yellow 215-693-7 |
| Product use | : Classification and labeling have been performed according to EU Directives 67/548/EEC and 1999/45/EC (including amendments) and the intended use. - Industrial applications. |

16. Other information

| | |
|--|---|
| Full text of R-phrases referred to in sections 2 and 3 - Europe | : R15- Contact with water liberates extremely flammable gases. R10- Flammable. R40- Limited evidence of a carcinogenic effect. R61- May cause harm to the unborn child. R62- Possible risk of impaired fertility. R20- Harmful by inhalation. R22- Harmful if swallowed. R65- Harmful: may cause lung damage if swallowed. R33- Danger of cumulative effects. R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. |
| Prepared by | : GL Inks EHS |

Notice to reader

This MSDS summarises at the date of issue our best knowledge of the health, safety and environmental hazard information related to the product and, in particular, how to safely handle, use, and transport the product in the workplace. Since GL Specialized inks (Pty) Ltd cannot anticipate or control the conditions under which the product may be handled, used, stored or transported, each user must, prior to usage, review the MSDS in the context of how the user intends to handle, use, store or transport the product in the workplace and beyond; and communicate such information to all relevant parties. If clarification, or further information is required to ensure that an appropriate assessment can be made, the user should contact the company.

We shall not assume any liability of the accuracy or completeness of the information contained herein, or any advice given, unless there has been gross negligence on our part. In such an event, or liability shall be limited only to direct damages suffered. Our responsibility for the product as sold is subject to our standard terms and conditions. All risk with possession and application of the product passes on delivery.